

In re Patent Application of:
SHEARON ET AL
Serial No. 10/757,041
Filed: 01/14/2004

REMARKS

Prior to the present amendment, claims 1-12 were pending. With the addition of dependent claims 13-18, claims 1-18 are currently pending.

Reconsideration of this application in light of the foregoing amendments and following remarks is respectfully requested.

While the notice of allowable subject matter in claim 12 is gratefully appreciated, applicants respectfully submit that all of the original claims 1-12, as well as newly added claims 13-18, are directed to allowable subject matter. As such, the rejection of claims 1-11 under the provisions of 35 U.S.C. 102, as being allegedly anticipated by the patent to Goerke et al, is respectfully traversed.

Before discussing the shortcomings of the patent to Goerke et al to applicants' claimed invention, the foregoing amendments to the application will be briefly addressed. First of all, the title has been amended as suggested in item 2 on page 2 of the outstanding office action. Withdrawal of the objection to the title as being non-descriptive is, accordingly, earnestly solicited.

Newly added dependent claims 13-18 further delimit the claims upon which they depend from two standpoints. Each of dependent claims 13-15 more particularly characterizes the manner in which the output port is driven with a soft start voltage that corresponds to the start-up voltage signal applied to the operational amplifier. This is accomplished by way of the controlled output power circuit device, corresponding to the MOSFET M2, for example, or the MOSFET M200, respectively shown in

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Figures 1 and 3 of the drawings of the present application. As described, for example, in paragraph [024] of the specification, the voltage ramp applied at the inverting input 32 of the operational amplifier 30 is balanced at the source output of the output MOSFET M2, so that the desired soft start operation at the output port 12 is achieved. A similar description is found in paragraph [032] on page 19 of the specification for the embodiment of Figure 3.

Dependent claims 16-18 more particularly define the structure of the controlled switch or the comparator-controlled discharge switch, which corresponds to the MOSFET M1, shown in Figure 1, and M70 shown in Figure 3. Each of these controlled switches has an input terminal coupled to the input port, such as input port 11, an output terminal coupled to a receive a reference potential (shown as ground), and a control terminal coupled to the output of the comparator, such as output 23 of comparator 20.

Turning now to the rejection of claims 1-11 under the provisions of 35 U.S.C. 102, as set forth in paragraphs 4-15 on pages 2-8 of the outstanding office action, the following rebuttal is offered.

In the proposed correlation of the disclosure of Goerke et al with the definition of the invention in applicants' claim 1, in paragraph 5, on pages 2 and 3 of the outstanding office action, several deficiencies in the rejection become immediately apparent. First of all, the input port of Goerke et al, which is adapted to be coupled to the power supply, is not the terminal to which the voltage V_{REF} and resistor 60 are coupled, but is rather the input port 30 to which the voltage V_o is applied from a power supply, as described, for example, in column 1, lines 42 and 43 of the patent. The start-up voltage generator of Goerke et al

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includes the capacitor 90 and the resistor 130, which are coupled between the input port 30 and the output of the comparator 110 by way of the diode 120.

More significantly, however, is what applicants consider to be a mischaracterization in the statement of the rejection of the proposed comparison of the comparator 110 of Goerke et al with the comparator of applicants' claims. According to the statement of the rejection, the comparator 110 of Goerke et al supposedly has a first input 114 coupled to receive a second prescribed reference voltage that is less than the first prescribed reference voltage. The first prescribed reference voltage, according to the statement of the rejection, is the voltage at the node 70. Because of the complementary polarity voltage drops across cathode-to-cathode connected diodes 120 and 220 in the circuit of Goerke et al, the voltage at the input 114 of comparator 110, relative to the voltage at node 70, is necessarily the same voltage at the node 70, not less than that voltage. What is actually applied to the node 114 of the comparator 110, however, is a voltage V_+ , which is equal to the source voltage of the MOSFET 12 plus the voltage V_{LIM} supplied by voltage source 190, divided by two, as described in column 7, lines 9-11 of the patent to Goerke et al. The voltage supplied by the voltage source 190 is some voltage that is less than the voltage V_{cc} , as described in column 6, line 11 of the patent to Goerke et al. There is no discussion in the patent to Goerke et al of the relationship between the voltage V_+ and the reference V_{REF} , which effectively corresponds to the first reference voltage.

In addition, the second input 112 of the comparator 110 of Goerke et al is not coupled to monitor the output port 50. Instead, it is coupled to monitor the voltage at node 160, by way of a voltage divider comprised of resistors 170a and 170b. As

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described in column 7, lines 6-8 of Goerke et al, the voltage supplied by this voltage divider is a voltage V_{-} , which is equal to the gate voltage of the MOSFET 10 divided by two, or is equal to the sum of the source voltage (V_s) and the gate-to-source (V_{GS}) differential divided by two, as described in lines 6-8, of column 7 of Goerke et al.

A fundamental difference between the present invention and the circuit of Goerke et al is the fact that the comparator employed in the present invention monitors the voltage at the output terminal and controls the operation of the soft start voltage ramp circuit, by controllably turning on, or preventing from being turned on, the MOSFET M1, which controllably diverts current away from the capacitor C1, or allows current from the current source 10 to flow thereinto.

In the circuit of Goerke et al, the comparator 110, rather than monitoring the output voltage and controlling the MOSFET 10 in response to that output voltage, instead monitors the gate voltage applied to the MOSFET 10, by way of its coupling to the node 160, so that the intended current limiting function of the comparator will be achieved. This current limiting function is the essence of the Goerke et al patent.

Moreover, contrary to what is incorrectly alleged in the outstanding office action, the start-up voltage signal is not applied to the operational amplifier 20 in Goerke et al, but is rather applied to the MOSFET 10. The operational amplifier 20 monitors the output node 50 by way of the node 140 of the voltage divider comprised of resistors 142 and 144, and the voltage at the node 70, to which the output 118 of the current-limiting control comparator 110 is coupled by way of diode 120.

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Both the circuitry connections and the functionality of the comparators in each of applicants' claimed invention and Goerke et al are different from one another. Applicants claimed invention employs the comparator to enable the start-up voltage generator to apply the start-up voltage to the operational amplifier, so that the operational amplifier will drive the output port with the start-up voltage, in response to the voltage of output port exceeding the second prescribed reference voltage.

In contrast, the comparator 110 of the circuit of Goerke et al controls the voltage of the input terminal 22 of the operational amplifier 20 based upon a variation in the gate-to-source voltage V_{GS} , as monitored at node 160, relative to the reference voltage V_{LIM} , as supplied by reference voltage generator 190.

Applicants respectfully submitted that, upon a rereading of the patent to Goerke et al and the definition of the invention in applicants' claims, it will be realized that the patent to Goerke et al does not disclose or suggest applicants' invention, particularly as characterized by the circuit configuration of independent claims 1 and 9 and dependent claim 6.

Dependent claim 6 more particularly characterizes the circuit architecture of an individual or respective one of the plurality of soft start circuits claimed in independent claim 5. That circuit architecture is essentially what is defined in claim 1, discussed above.

Claim 5 clearly patentably distinguishes over what is disclosed by the patent to Goerke et al, by specifying that the soft start circuit architecture comprises a plurality of soft start circuits, each respective one of which is operative to control the generate a soft start voltage waveform in response to

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a controlled power output device thereof being brought to a prescribed state of operation, and a control circuit which is operative to prevent any of said soft start circuits from generating a soft start voltage waveform until all of said controlled power output devices of said plurality of said soft start circuits have been brought to said prescribed state of operation.

Nowhere in the patent to Goerke et al is there any disclosure or suggestion of any soft start circuit architecture that comprises a plurality of soft start circuits, as claimed in claim 5. Consequently, the characterization of Goerke et al with respect to claim 5, in item 9 on page 4 of the outstanding office action, is inaccurate.

With respect to the dependents claims, since the basic circuit architecture and functionality of the soft start switch of Goerke et al does not apply to the independent claims, it necessarily does not apply to the dependent claims.

Moreover, with regard to claim 2, comparator 110 of Goerke et al is not operative to prevent the start-up voltage generator from applying a start-up voltage signal to the first input of the operational amplifier 20. As pointed out above, the start-up voltage generator of Goerke et al applies its start-up voltage to the drain 16 of MOSFET 10, the source of which is coupled by way of Schottky diode 40 to the output 50. There is no controlled enabling of preventing of the coupling of a start-up voltage to the operational amplifier 20 in Goerke et al.

With respect to claim 3, Goerke et al employs a capacitor 90 and a reference voltage V_{REF} that is applied to a node to which the resistor 60, coupled to the capacitor 90, is coupled. There

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is no input current generator coupled to the capacitor 90 as claimed.

With respect to claim 4, Goerke et al disclose no comparator-controlled discharge switch which prevents the capacitor 90 from being charged in response to the voltage of the output port not exceeding the second prescribed reference voltage. Rather, as pointed out above, the output of comparator 110 either forward- or reverse-biases diode 120, depending upon whether the gate voltage of the MOSFET 10 exceeds or is less than the reference V_{LIM} supplied by reference voltage generator 190.

With respect to dependent claims 7 and 8, the comments above applied to claims 3 and 4 are equally applicable thereto.

With respect to dependent claims 10 and 11, Goerke et al disclose no current source connected to the capacitor 90, but rather couples one end of the capacitor to the input port 30 and the other end by way of a resistor 60 to a voltage reference V_{REF} . Consequently, the voltage at the node 70, which has been attributed to the first prescribed reference voltage, corresponds to the output of the comparator 110, offset by the diode voltage drop through diode 120. There is no current from the current generator for controllably charging the capacitor 90, that produces this first prescribed voltage by way of flow through a reference resistor to the input 22 of the operational amplifier 20.

Newly added dependent claims 13-15 more particularly characterize the manner in which the controlled output power circuit device (e.g., MOSFET M2) replicates the soft start voltage at the output port. Rather than causing such a replication of a soft start voltage, the comparator 20 of Goerke et al serves to limit the current flow to the MOSFET 10.

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As to dependent claims 16-18, the comparator-controlled discharge switch, corresponding to the MOSFET M1, for example, of Figure 1 of the drawings of the present application, is more particularly characterized in terms of the structure and connectivity with the remaining parts of the circuit. There is no such comparator-controlled discharge switch having an input terminal, an output terminal and a control terminal, connected as claimed in claims 16-18, in the circuit of Goerke et al.


In view of the inapplicability of the patent to Goerke et al to applicants' claimed invention, and in the absence of a citation of prior art which teaches or suggests the invention as currently characterized in claims 1-18, favorable reconsideration of this application and a Notice of Allowability of claims 1-18 are, according, earnestly solicited.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

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Respectfully submitted,



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